

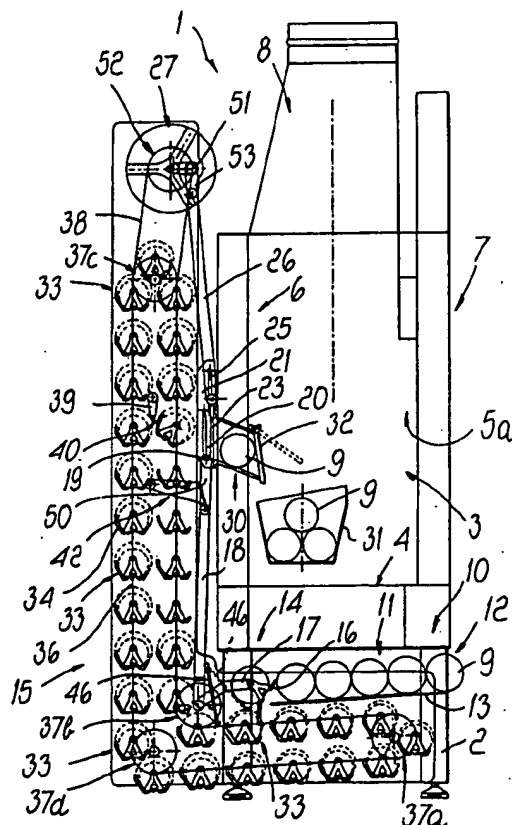


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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**(54) Title:** FEEDER PARTICULARLY FOR STOVES OR FIREPLACES**(57) Abstract**

A feeder, particularly for stoves or fireplaces comprising a supporting frame for a combustion chamber (3) and a flue gas conveyance hood (8), the feeder comprising a first log input station (10) and a second station (14) for loading logs onto an element (15) for selectively conveying and unloading them into the combustion chamber.



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## FEEDER PARTICULARLY FOR STOVES OR FIREPLACES

### Technical Field

The present invention relates to a feeder for stoves or fireplaces.

### 5 Background Art

Stoves or fireplaces are usually constituted by a frame which is composed of a plurality of legs whose height can be adjusted and supports a combustion chamber which is usually open at the front and top and is connected to a hood for conveying the gases produced by the combustion of suitable wood  
10 which can be placed in the combustion chamber.

A drawback of these conventional fireplaces is substantially constituted by the fact that the user has to periodically check the amount of wood present in the combustion chamber, in order to prevent the fire from going out and in order to maintain always approximately at the same level the amount of heat  
15 obtained for example in order to heat a room.

Secondly, it is noted that while loading the wood the user can get scalded or, in the worst case, his clothes can catch fire, with consequent danger for his safety.

### Disclosure of the Invention

20 The aim of the present invention is to solve the above-mentioned problems, eliminating the drawbacks of the cited prior art, by providing a device which allows to use a stove or fireplace while maintaining over time, without any direct intervention on the part of the user, a chosen and preset thermal load and therefore a chosen radiation of heat for example into the  
25 surrounding room.

Within the scope of this aim, an important object of the present invention is to provide a device which allows to feed suitable logs into the combustion chamber automatically and without the intervention of the user.

Another important object of the present invention is to provide a device  
30 which allows to feed logs into the combustion chamber as soon as the heat

that is present therein decreases below a preset threshold.

Another important object of the present invention is to provide a device which is structurally simple and can be applied to conventional stoves or fireplaces without substantially altering their front styling, which is the one  
5 that can be seen by the user.

Another important object of the present invention is to provide a device which also allows to check the number of logs available for feeding the combustion chamber.

Another object of the present invention is to provide a device which  
10 spares the user from having to directly feed the logs into the combustion chamber and is reliable and safe in use.

This aim, these objects and others which will become apparent hereinafter are achieved by a feeder, particularly for stoves or fireplaces comprising a supporting frame for a combustion chamber and a flue gas conveyance hood,  
15 characterized in that it comprises a first log input station and a second station for loading said logs onto a means for selectively conveying and unloading them into said combustion chamber.

Advantageously, means are provided for activating the conveyance and unloading means according to the chosen amount of heat generated in the  
20 combustion chamber.

#### Brief Description of the Drawings

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a particular but not exclusive embodiment thereof, illustrated only by way of non-limitative  
25 example in the accompanying drawings, wherein:

Figure 1 is a front view of a fireplace with the feeder according to the present invention applied thereto;

Figure 2 is a side view of the fireplace with the feeder applied thereto during the transfer of a log into the first station for input to the means for  
30 conveying and unloading said log;

Figure 3 is a view, similar to Figure 2, of the feeder during the unloading of a single log into the combustion chamber;

Figure 4 is a detail side view of the means for selectively unloading the log into the combustion chamber.

5 Ways of carrying out the Invention

With reference to the above figures, the reference numeral 1 designates a fireplace which is constituted by a frame which comprises a plurality of legs 2 whose height can optionally be adjusted and which support a structure which forms a combustion chamber 3. The chamber 3 accordingly has a base  
10 4, two side walls 5a and 5b, a rear wall 6 and a front opening 7.

The combustion chamber 3 is connected, in an upward region, to a hood 8 for conveying the flue gases to a suitable flue (not shown).

The feeder comprises a first input station for logs, advantageously of the type obtained by pressing material and therefore preferably of the type  
15 having uniform dimensions for example in terms of length and diameter.

The first input station, designated by the reference numeral 10, is constituted by a box-like structure 11 which is preferably arranged below the base 4 of the fireplace 1 and has a front opening 12 through which the logs can be introduced and arranged transversely to the fireplace.

20 The box-like structure 11 has a first inclined plane 13 which is suitable to convey the logs at a second station, generally designated by the reference numeral 14, for loading the logs onto a means for actually conveying and unloading them, designated by the reference numeral 15.

The second station is substantially constituted by a first cradle 16 for  
25 supporting a single log 9; the cradle is substantially C-shaped and its wings are freely pivoted, at their ends, at the wall of the box-like structure 11.

The first cradle 16 is forced to oscillate counterclockwise, so as to unload the individual log into an underlying region, by means of a first pair of rods 17 which are conveniently arc-shaped and are associated, at one end, with the  
30 wings of the first cradle and are pivoted, at the other end, at the end of a

second pair of rods 18 which are arranged behind the rear wall 6 of the fireplace 1.

At the other end, each one of the second pair of rods 18 is pivoted to a pair of fourth rods 50 which are in turn pivoted, at one end, to two first pivots 19 which can slide at a suitable first pair of guiding elements 20 which are substantially S-shaped; said first pair of guiding elements 20 is formed at a suitable pair of walls 21 which protrude behind the rear wall 6 of the fireplace 1.

Each one of the first pivots 19 is connected, by means of a bar 22 (see Figure 4), laterally to a door 23 which has, at its upper end, two second pivots 24 which can slide at a second pair of guiding elements 25 which are also formed at the walls 21 and have the same shape as the first pair of guiding elements.

The second pivots or the door are rotatably associated with a third pair of rods 26 which are eccentrically rigidly coupled, at their other end, at a Maltese cross, designated by the reference numeral 27, which preferably has three lobes, so that a rotation through  $360^\circ$  of the driving shaft 51 produces a rotation through  $120^\circ$  of the Maltese cross 27, which is rotationally rigidly coupled to a toothed pinion 52.

A radial crank 53 is rigidly coupled to the driving shaft 51, and the third pair of rods 26 is pivoted thereto.

The rotation of the crank must be counterclockwise; this entails the lifting of the third pair of rods 26 and therefore the lifting of the door 23 and of the second and third pairs of rods 18, which accordingly force the first cradle 16 to perform a clockwise rotation by means of the first pair of rods 17.

At the door 23 there is, in the rear wall 6, an opening 29 which allows the passage of a single log at a duct 30 which protrudes inside the combustion chamber 3 in a region above a suitable brazier 31; the end of the duct is temporarily concealed by a swiveling flap 32 which is freely and transversely pivoted in an upward region, so that when a single log 9 is placed inside the

duct 30 the flap can partially turn counterclockwise and the log can fall into the underlying brazier 31.

The means for selectively conveying and unloading the logs 9 is further constituted by a plurality of second cradles 33 which are approximately  
5 identical to the first cradle 16 except for a lateral tab 34 which protrudes further from the base 35 in order to allow better containment of the log 9; the tab 34 is preferably present at the side that is not directed toward the rear wall 6 of the fireplace.

The ends of the wings of each one of the second cradles is in fact freely  
10 rotatably pivoted at a suitable traction element, such as a chain 36, which is guided at four guiding elements: a first guiding element 37a, arranged in the region below the box-like structure 11; a second guiding element 37b, also located in the region below the box-like structure 11 but adjacent to the base 4 of the fireplace; a third guiding element 37c, located behind the rear wall 6  
15 and appropriately spaced therefrom; and a fourth guiding element 37d, arranged proximate to the ground where the legs 2 rest in a region adjacent to said second guiding element.

A carousel is thus formed which allows to position the various second cradles 33 by passing below the second station 14 and in the region that faces  
20 the door 23.

The movement can be supplied to the chain 36 for example by means of a suitable belt or other chain 38 which is moved by means of the toothed pinion 52 which is coaxial to the Maltese cross 27.

The second cradle 33 located at the door 23 is allowed to tip by two levers  
25 39 which are arranged in an intermediate region between the two vertical stacks of the second cradles located behind the fireplace and slightly above the region provided with the door 23; the two levers have, at their free end, a hook 40 which is suitable to engage at a suitable pair of holes 41 formed at one end of the tab 34 of each second cradle 33.

30 There are of course means for activating the rotation of the two levers 39

when it is necessary to overturn them in order to convey the log 9 into the brazier 31.

In order to facilitate the fall of the log 9 there is also a guiding means, constituted by a profiled element 42, which is substantially C-shaped and whose wings are rotatably pivoted, at their ends, at suitable third pivots 43 which are arranged in the intermediate region between the two vertical stacks of second cradles 33 and whose counterclockwise oscillation moves the connecting base 44 into the region below the second cradle engaged by the hook 40, producing a sliding surface for the log 9 which conveys the log into the duct 30.

The oscillation of the profiled element 42 is actuated directly by the lifting of the second pair of rods 18, which are articulated thereto by means of fourth pivots 45.

The feeder further comprises a means which is suitable to prevent the unloading of a log 9 from the first cradle 16 if the underlying second cradle 33 already supports another log; said means is constituted by a partition 46 which oscillates so as to block the fall of the log 9 from the first cradle 16, as shown in Figure 2.

The feeder also has means for activating the chain 36, the toothed pinion 52 and therefore the Maltese cross 27, the two levers 39 and the partition 46; said means are, for example, constituted by proximity sensors or automatic controls which are dependent for example on a presettable value of the temperature inside the combustion chamber 3.

For example, it is possible to provide a sensor which detects the presence or absence of a log in the three second cradles that are adjacent to the two levers 39; the presence of logs therefore allows to activate the two levers 39 in order to allow to unload them, whereas any absence of the logs blocks the pair of levers 39, forcing the rotation of the chain 36 in order to load other logs 9 stored previously inside the box-like structure 11, or reporting to the user that it is necessary to reload all the second cradles 33.



The levers 39 can also be always activated for the rotation of the adjacent second cradle 33, even in the absence of a log; however, if a suitable sensor warns that the available logs are about to be used up, the levers 39 are deactivated so that loading in the second station 14 can occur.

5        Use of the feeder is as follows: initially, the user loads the second cradles 33 by inserting the logs 9 at the front opening 12 of the box-like structure 11; at the same time, the toothed pinion 52 and therefore the Maltese cross 27 are activated, forcing the unloading of one log at a time at the underlying second cradles 33; this operation is repeated until a sensor indicates the presence of  
10       logs in all the second cradles 33.

      Once the fire has been lit inside the brazier 31, a suitable sensor activates the two levers 39 when, for example, the temperature drops below a certain value; in this manner, the logs are unloaded in sequences of three logs, forcing the lifting of the third pair of rods 26 so as to entail the simultaneous  
15       lifting of the profiled element 42, whose connecting base 44 forms a surface for conveying the log into the duct 30.

      In this condition, the activation of the two levers 39 allows a single second cradle 33 to tip, transferring the log 9 into the brazier 31 through the swiveling flap 32.

20       It has thus been observed that the invention achieves the intended aim and objects, a feeder having been provided which allows to use a fireplace so as to maintain, without any direct intervention by the user, a chosen and preset thermal load and therefore a chosen heat radiation into the surrounding space or into other spaces through suitable and known heat conveyance devices.

25       The feeder also allows to introduce suitable logs automatically into the combustion chamber as soon as the heat that is present therein drops below a preset threshold, which can be detected by suitable conventional sensors.

      The feeder is furthermore simple and can be applied to conventional stoves or fireplaces without substantially altering their front styling, which is  
30       the one that is visible to the user; finally, the feeder also allows to check the

number of logs available for feeding the combustion chamber.

The feeder is of course susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept.

The materials and the dimensions that constitute the individual  
5 components of the invention may also of course be the most pertinent according to specific requirements.

The disclosures in Italian Patent Application No. TV99A000010 from which this application claims priority are incorporated herein by reference.

### CLAIMS

1. A feeder, particularly for stoves or fireplaces comprising a supporting frame for a combustion chamber and a flue gas conveyance hood,  
5 characterized in that it comprises a first log input station and a second station for loading logs onto a means for selectively conveying and unloading them into said combustion chamber.

2. The feeder according to claim 1, characterized in that it comprises means for activating said means for the selective conveyance and unloading  
10 of said logs into said combustion chamber according to a chosen and presettable temperature inside said combustion chamber.

3. The feeder according to claim 1, characterized in that said first log input station is constituted by a box-like structure which is arranged below a base of the combustion chamber and has a front opening through which said  
15 logs can be introduced so as to lie transversely to the fireplace.

4. The feeder according to claim 3, characterized in that said box-like structure has a first inclined plane which is suitable to convey the logs at said second station for loading them onto said means for selectively conveying and unloading the logs.

20 5. The feeder according to claim 1, characterized in that said second station is constituted by a first cradle for supporting a single log, said cradle being substantially C-shaped and having wings which are freely pivoted, at their end, at the wall of said box-like structure.

6. The feeder according to claim 5, characterized in that said first cradle is  
25 forced to oscillate counterclockwise, so as to unload said individual log into an underlying region, by means of a first pair of rods which are arc-shaped and are associated, at one end, with the wings of said first cradle and are pivoted, at their other end, to the end of a second pair of rods arranged behind a rear wall of said fireplace.

30 7. The feeder according to claim 6, characterized in that at the other end

each rod of said second pair of rods is pivoted to a pair of fourth rods which are in turn pivoted, at one end, to two first pivots which can slide at a first pair of S-shaped guiding elements, said first pair of guiding elements being formed at a pair of walls which protrude behind said rear wall of said fireplace.

8. The feeder according to claim 7, characterized in that each one of said first pivots is connected, by means of a bar, laterally to a door which has, at its upper end, two second pivots which can slide at a second pair of guiding elements which are also formed at said pair of walls which protrude behind said rear wall of said fireplace and have the same shape as said first pair of guiding elements.

9. The feeder according to claim 8, characterized in that said second pivots or said door are rotatably associated with one end of a third pair of rods which are rigidly coupled, at their other end, eccentrically at a crank system so that a rotation through  $360^\circ$  of a driving shaft produces a  $120^\circ$  rotation of said crank system, which in turn rotates rigidly with a toothed pinion, a radial crank being rigidly coupled to said driving shaft, said third pair of rods being pivoted to said crank and being rotatable counterclockwise so as to lift said third pair of rods and accordingly lift said door and said second and third pairs of rods.

10. The feeder according to claim 8, characterized in that the counterclockwise rotation of said crank system entails the lifting of said third pair of rods and therefore the lifting of said door and the lifting of said second pair of rods, which force a clockwise rotation of said first cradle by means of said first pair of rods.

11. The feeder according to claim 8, characterized in that an opening is formed at said door in said rear wall of said fireplace and is adapted to allow the passage of an individual log at a duct which protrudes inside said combustion chamber in a region that lies above a brazier, the end of said duct being temporarily concealed by a swiveling flap which is freely pivoted

transversely and in an upward region, so that when a single log is placed inside said duct said flap can partially overturn in a counterclockwise direction and the log can fall into said underlying brazier.

12. The feeder according to claim 9, characterized in that said means for  
5 selectively conveying and unloading said logs is further constituted by a plurality of second cradles which have a substantially C-shaped transverse cross-section, a lateral tab protruding transversely to a base of the second cradles in order to allow better containment of said log.

13. The feeder according to claims 1 and 12, characterized in that the ends  
10 of wings of each one of said second cradles are freely rotatably pivoted at a traction element, which is guided at four guiding elements: a first guiding element, which is located in the region below said box-like structure; a second guiding element, which is located in the region below said box-like structure and adjacent to a base of said fireplace; a third guiding element,  
15 which is located behind a rear wall of said fireplace and spaced therefrom; and a fourth guiding element, which is located proximate to the ground where legs of said fireplace rest in a region adjacent to said second guiding element.

14. The feeder according to claim 13, characterized in that there is a  
20 carousel which allows to place said second cradles so as to pass below said second station and in the region that faces said door, said traction means being actuated by means of a belt which is moved by said toothed pinion which is coaxial to said crank system.

15. The feeder according to claim 9, characterized in that it comprises two  
25 levers which are arranged in a region which is intermediate between two vertical stacks, located behind said fireplace, which are formed by said second cradles, said two levers being arranged above the region provided with said door and being suitable to allow the tipping of said second cradle which is located, in its carousel-like path, at said door.

30 16. The feeder according to claim 15, characterized in that said two levers

have, at their free end, a hook which is adapted to engage at a pair of holes formed at one end of said tab of each one of said second cradles.

17. The feeder according to claim 16, characterized in that it comprises a guiding means which is adapted to facilitate the fall of said individual log, said means being constituted by a C-shaped profiled element whose wings are rotatably pivoted, at their ends, at third pivots which are arranged in the region between said two vertical stacks of said second cradles and whose counterclockwise oscillation places the connecting base in the region below said second cradle engaged by said hook, forming a sliding surface for said individual log which conveys said log into said duct.

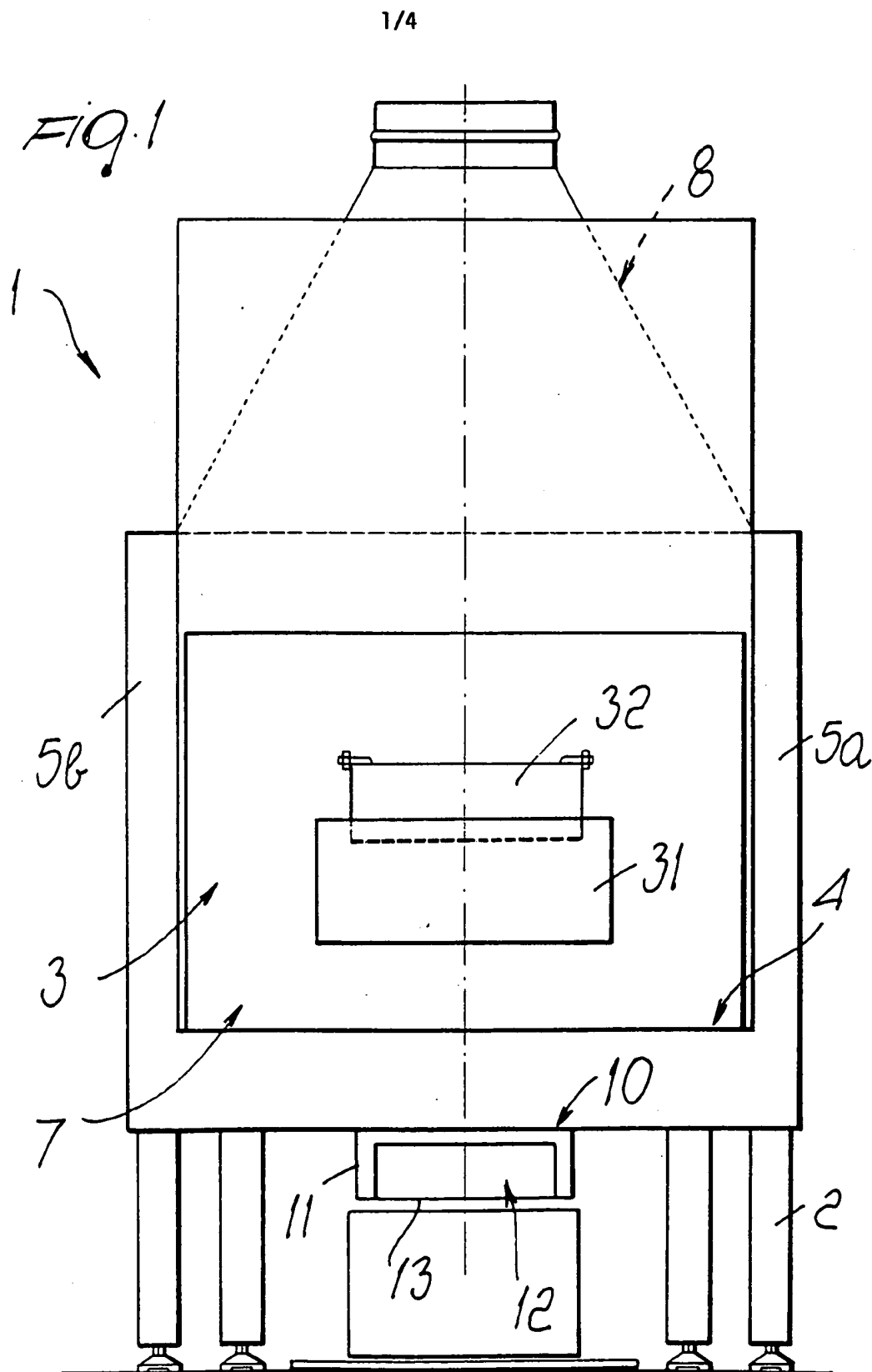
18. The feeder according to claim 17, characterized in that said profiled element is directly actuated so as to oscillate by the lifting of said second pair of rods by being articulated thereto by means of fourth pivots.

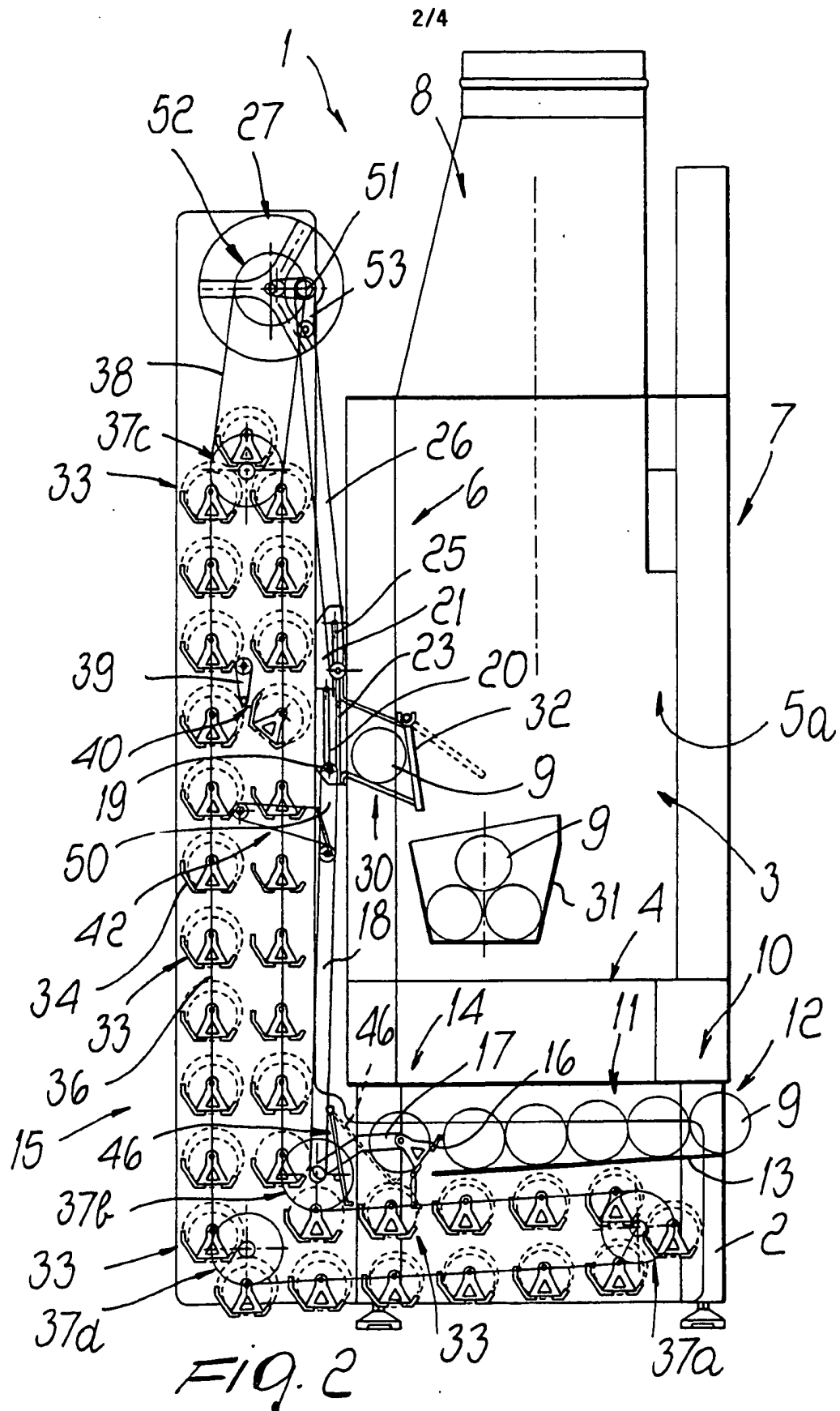
19. The feeder according to claim 12, characterized in that it comprises a means which allows to prevent the unloading of a log from said first cradle if the underlying second cradle already supports another log, said means being constituted by a partition which oscillates so as to block the fall of said log from said first cradle.

20. The feeder according to claim 19, characterized in that it comprises means which are suitable to activate said traction element, said crank system, said pair of levers and said partition, said means being constituted by proximity sensors or automatic controls which are linked to a presettable value of the temperature inside said combustion chamber.

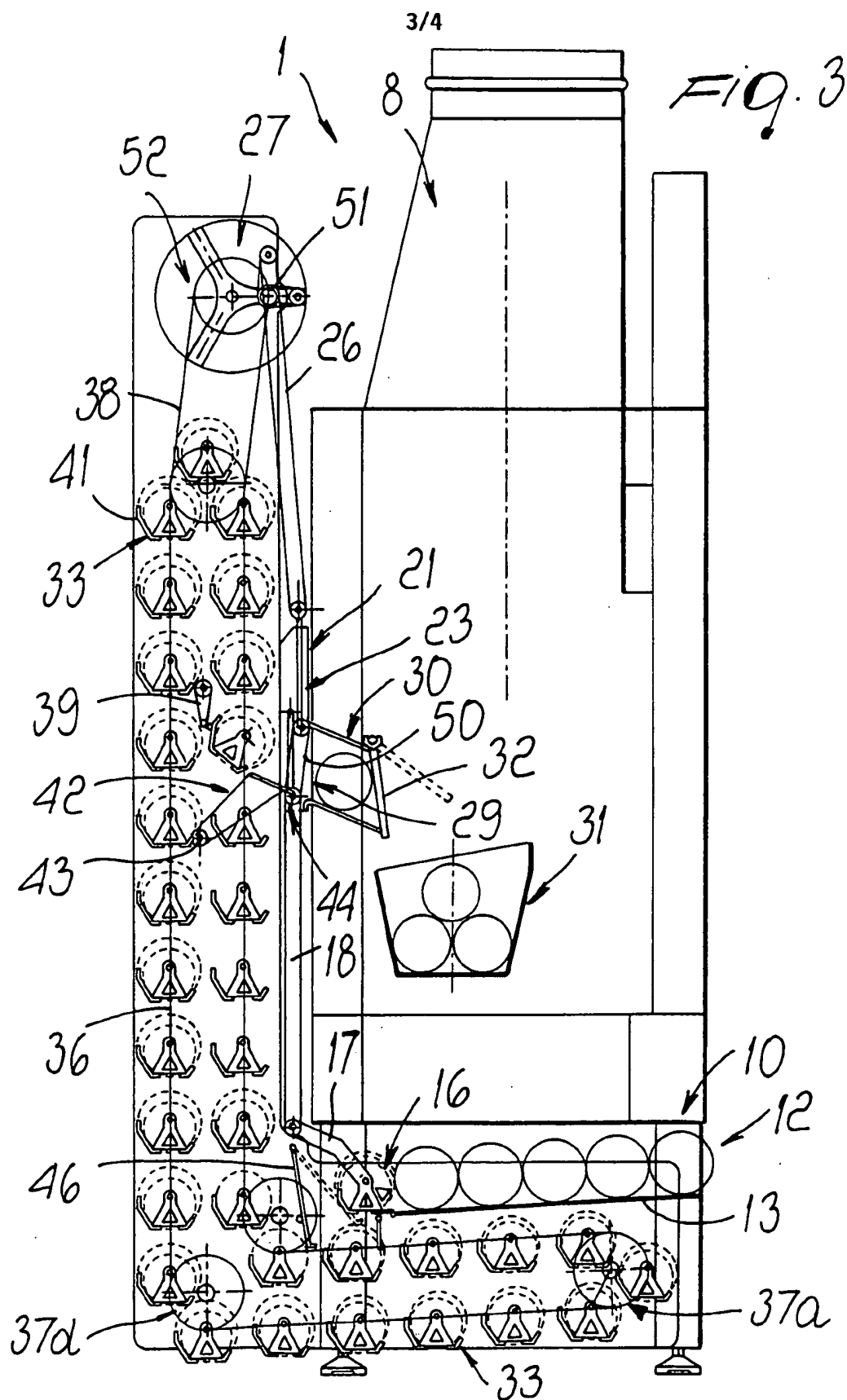
21. The feeder according to claim 15, characterized in that it comprises a sensor which is suitable to detect the presence or absence of a log in the second cradles that are adjacent to said pair of levers.

22. The feeder according to claim 21, characterized in that it comprises means for activating the rotation of said pair of levers when it is necessary to overturn them in order to convey said log into said brazier.









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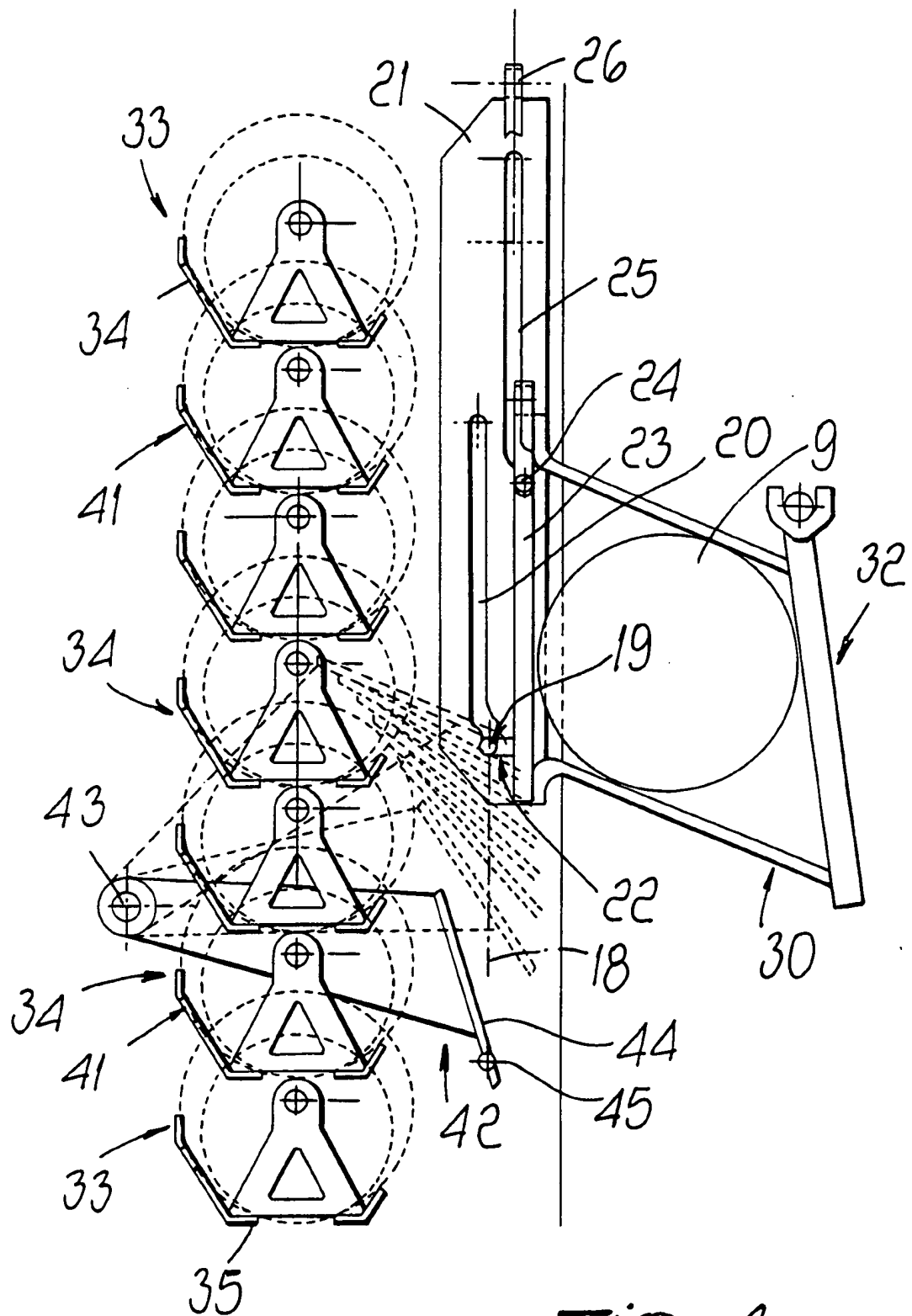


Fig. 4

# INTERNATIONAL SEARCH REPORT

Int'l. Appl. No.

PCT/EP 00/00431

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F24B1/199

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F24B F23K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 462 046 A (HANNAH JACQUILYN K) 31 October 1995 (1995-10-31) column 4, line 54 -column 6, line 17; figures	1,2
A		2-5
A	FR 2 571 125 A (AGARRA HENRI) 4 April 1986 (1986-04-04) abstract	1
A	US 4 865 016 A (LANDRY JOSEPH L) 12 September 1989 (1989-09-12) abstract	1

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☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

In .tional Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5462046	A	31-10-1995	NONE	
FR 2571125	A	04-04-1986	NONE	
US 4865016	A	12-09-1989	NONE	